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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/673,375

09/30/2003

Anthony Dip

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EXAMINER

HARRISON, MONICA D

ART UNIT

PAPER NUMBER

2813

NOTIFICATION DATE

DELIVERY MODE

06/18/2007

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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**Office Action Summary**

Application No.

10/673,375

Applicant(s)

DIP ET AL.

Examiner

Monica D. Harrison

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 February 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20, 23-37, 47 and 49 is/are pending in the application.
- 4a) Of the above claim(s) 21, 22, 38-46, 48, 51 and 52 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20, 23-37, 47 and 49 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>2/27/07; 5/24/07</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Election/Restrictions*

1. Claims 38-46 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected Group II, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 2/20/07. Examiner acknowledges claims 21, 22, 48, 50 and 51 are cancelled.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-20, 23-37, 47 and 49 are rejected under 35 U.S.C. 102(e) as being anticipated by Vatus et al (US 2004/0175893 A1).

2. Regarding claim 1, Vatus et al discloses a method of depositing a silicon-containing film on a substrate, the method comprising: providing a substrate in a process chamber of a processing system (pg.1, paragraphs 0009-0011); heating the substrate (pg.3, paragraph 0031); exposing a HCD process gas to the substrate (Figure 4, reference 604); and depositing a silicon-containing epitaxial or silicon germanium film on the substrate using the HCD process gas (Figure 4, reference 606).

3. Regarding claim 2, Vatus et al discloses wherein the exposing comprises exposing an inert gas to the substrate (pg.6, paragraph 0063; Figure 7, reference 299).

4. Regarding claim 3, Vatus et al discloses wherein the exposing further comprises flowing the HCD gas at a flow rate between about 5 sccm and about 1,000 sccm and the inert gas at a flow rate between about 5 sccm and about 20,000 sccm (pg.3, paragraph 0030).

5. Regarding claim 4, Vatus et al discloses wherein the exposing further comprises exposing a hydrogen-containing gas to the substrate (pg.3, paragraph 0030).

6. Regarding claim 5, Vatus et al discloses wherein the exposing further comprises exposing H<sub>2</sub> to the substrate (pg.3, paragraph 0030).

7. Regarding claim 6, Vatus et al discloses wherein the exposing further comprises flowing a hydrogen-containing gas at a flow rate between about 5 sccm and about 5,000 sccm (pg.3, paragraph 0029).

8. Regarding claim 7, Vatus et al discloses wherein the exposing further comprises exposing a second silicon-containing gas to the substrate (pg.3, paragraph 0029).

9. Regarding claim 8, Vatus et al discloses wherein the exposing further comprises exposing at least one of SiH<sub>4</sub>, SiCl<sub>4</sub>, Si<sub>2</sub>H<sub>6</sub>, and SiH<sub>2</sub>Cl<sub>2</sub> to the substrate (pg.3, paragraph 0030).

10. Regarding claim 9, Vatus et al discloses wherein the exposing further comprises flowing a second silicon-containing gas at a flow rate between about 5 sccm and about 1,000 sccm (pg.3, paragraphs 0029-0030).

11. Regarding claim 10, Vatus et al discloses wherein the exposing further comprises exposing a hydrogen-containing gas and a second silicon-containing gas to the substrate (pg.3, paragraphs 0029-0030).

12. Regarding claim 11, Vatus et al discloses wherein the exposing further comprises exposing H<sub>2</sub> and at least one of SiH<sub>4</sub>, SiCl<sub>4</sub>, Si<sub>2</sub>H<sub>6</sub>, and SiH<sub>2</sub>Cl<sub>2</sub> to the substrate.

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13. Regarding claim 12, Vatus et al discloses wherein the exposing further comprises exposing a HCD gas and at least one of a phosphor-containing gas, a boron-containing gas, and a nitrogen-containing gas to the substrate (pg.3, paragraph 0030).

14. Regarding claim 13, Vatus et al discloses wherein the exposing further comprises exposing a HCD gas and at least one of  $\text{PH}_3$ ,  $\text{B}_2\text{H}_6$ ,  $\text{BCl}_3$ , and  $\text{AsH}_3$  to the substrate (pg.3, paragraph 0028).

15. Regarding claim 14, Vatus et al discloses wherein the exposing further comprises exposing a halogen-containing gas to the substrate (pg.2, paragraph 0026).

16. Regarding claim 15, Vatus et al discloses wherein the exposing further comprises exposing at least one of  $\text{HF}$ ,  $\text{F}_2$ ,  $\text{Cl}_2$ , and  $\text{HCl}$  to the substrate (pg.2, paragraph 0026).

17. Regarding claim 16, Vatus et al discloses wherein the exposing further comprises exposing a germanium-containing gas to the substrate (pg.3, paragraph 0028).

18. Regarding claim 17, Vatus et al discloses wherein the exposing further comprises exposing at least one of a hydrogen-containing gas, a dopant gas, and a halogen-containing gas to the substrate (pg.3, paragraph 0030).

19. Regarding claim 18, Vatus et al discloses Claim 18 (Original): The method according to claim 1, wherein the exposing further comprises exposing at least one of  $\text{GeH}_4$  and  $\text{GeCl}_4$  to the substrate (pg.3, paragraph 0030).

20. Regarding claim 19, Vatus et al discloses wherein the exposing further comprises exposing a hydrogen-containing gas and a germanium-containing gas to the substrate (pg.3, paragraphs 0028-0030).

21. Regarding claim 20, Vatus et al discloses wherein the exposing further comprises exposing H<sub>2</sub> and GeH<sub>4</sub> to the substrate (pg.3, paragraph 0030).

22. Regarding claim 23, Vatus et al discloses wherein the exposing comprises exposing a HCD process gas including HCD gas and a germanium-containing gas to the substrate; and the depositing comprises depositing a SiGe-containing film on the substrate (pg.2, paragraph 0025).

23. Regarding claim 24, Vatus et al discloses wherein the depositing comprises selectively depositing a SiGe-containing film on a silicon surface (pg.2, paragraph 0025).

24. Regarding claim 25, Vatus et al discloses wherein the depositing comprises depositing a SiGe-containing film having a germanium content below about two atomic percent (pg.2, paragraph 0025).

25. Regarding claim 26, Vatus et al discloses wherein the depositing comprises depositing a SiGe-containing film having a germanium content greater than about two atomic percent (pg.2, paragraph 0025).

26. Regarding claim 27, Vatus et al discloses wherein the heating comprises heating the substrate to between about 500°C and about 900°C (pg.3, paragraph 0031).

27. Regarding claim 28, Vatus et al discloses wherein the heating comprising heating the substrate to between about 700°C and about 900°C (pg.3, paragraph 0031).

28. Regarding claim 29, Vatus et al discloses wherein the heating comprises heating the substrate to a temperature of about 800°C and the depositing comprises selectively depositing an epitaxial silicon-containing or silicon germanium film on a silicon surface of the substrate (pg.3, paragraph 0031).

29. Regarding claim 30, Vatus et al discloses wherein the heating comprises heating the substrate to a temperature of about 700°C and the depositing comprises non-selectively depositing the silicon-containing or silicon germanium film on the substrate (pg.1, paragraph 0009).

30. Regarding claim 31, Vatus et al discloses providing a process chamber pressure less than about 100 Torr (pg.3, paragraph 0032).

31. Regarding claim 32, Vatus et al discloses providing a process chamber pressure less than about 10 Torr (pg.3, paragraph 0032).

32. Regarding claim 33, Vatus et al discloses providing a process chamber pressure of about 0.4 Torr (pg.3, paragraph 0032).

33. Regarding claim 34, Vatus et al discloses pretreating the substrate prior to exposing a HCD process gas to the substrate (pg.3, paragraph 0031).

34. Regarding claim 35, Vatus et al discloses wherein the pretreating comprises exposing a H<sub>2</sub> gas to the substrate at a substrate temperature between about 500°C and about 1000°C (pg.2, paragraph 0027).

35. Regarding claim 36, Vatus et al discloses wherein the pretreating comprises exposing a H<sub>2</sub> gas to the substrate at a substrate temperature of about 900°C (pg.2, paragraph 0027).

36. Regarding claim 37, Vatus et al discloses a computer readable medium containing program instructions for execution on a processor, which when executed by the processor, cause a processing apparatus to perform the steps in the method recited in claim 1 (pg.1, paragraph 0011).

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37. Regarding claim 47, Vatus et al discloses a method of depositing a silicon-containing film on a substrate, the method comprising: providing a substrate in a process chamber of a processing system (pg.1, paragraph 0009); heating the substrate (pg.1, paragraph 0009); exposing a HCD process gas to the substrate (pg.3, paragraph 0030); and depositing a silicon-containing epitaxial film on the substrate using the HCD process gas wherein the depositing comprises selectively depositing an epitaxial Si film on a crystalline Si substrate (pg.1, paragraph 0005).

38. Regarding claim 49, Vatus et al discloses a method of depositing a silicon-containing film on a substrate, the method comprising: providing a substrate in a process chamber of a processing system (pg.1, paragraph 0009); heating the substrate (pg.1, paragraph 0009); exposing a HCD process gas to the substrate (pg.3, paragraph 0031); and depositing a silicon-containing epitaxial film on the substrate using the HCD process wherein the depositing comprises selectively depositing an epitaxial SiGe film on a crystalline Si substrate (pg.2, paragraph 0025).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica D. Harrison whose telephone number is 571-272-1959. The examiner can normally be reached on M-F 7:00am-3:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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June 11, 2007

  
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